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ARTICLE II.

THE RESTIGOUCHE — WITH NOTES ESPECIALLY ON ITS FLORA.

BY G. U. HAY, M.A., F.R.S.C.

(Read December 1st, 1896.)

Last summer, in company with Dr. W. F. Ganong, I made a trip down the Restigouche in a canoe. On the morning of the 25th July, we started from St. Leonard's Station, about thirteen miles above Grand Falls on the St. John, and made the portage through to the headwaters of the Restigouche, twenty-five miles, arriving there about four o'clock that afternoon. Twelve days after we reached Campbellton after a most delightful trip, in almost uninterrupted fine weather, and upon a river that has no superior in romantic and picturesque scenery, even in this province of beautiful rivers.

Twelve years ago when I stood on Bald Mountain at the head of the Tobique and looked over the expanse of virgin forest, amid which the Restigouche threads its way through a wild and deep valley seaward, I had a desire to know more of a river that is alike the sportsman's paradise, the delight of artists, and almost a *terra incognita* to naturalists. With an appetite sharpened by twelve years of waiting, I became a willing partner in last summer's excursion.

For the first twelve miles of our portage through from the St. John to the head waters of the Restigouche we had a good road. Our portageurs — three men in all — drove ahead on a stout wagon drawn by two horses,

with our canoe and baggage, while we brought up the rear in a light wagon. The remaining thirteen miles we made mostly on foot over a very rough road.

The morning was bright and beautiful, and for two or three miles we drove along the banks of the St. John until we came to the Grand River, up the ridge bordering on whose valley we were soon winding by a succession of hills that brought us gradually to the northern watershed of New Brunswick. The view from one of the highest of these hills is strikingly picturesque. Behind us lay the broad valley of the St. John flowing with sweeping majestic curves from its home in the northern wilderness, passing the quiet villages of St. Leonard's and Van Buren, and then continuing in a long, quiet stretch as if preparing for the rush and leap at the Grand Falls. On the opposite side of the St. John lay the highlands of Maine. On our right was the narrow gorge of the Grand River, and on our left the valleys of the Siegas and Quisibis with the lofty peaks of Green River and Quisibis Mountains in the distance. Except the narrow settlement we were going through, all around was an unbroken wilderness. Along the Grand River Settlement there were three grades of settlers, nearly all French, or descendants of French, from the Province of Quebec and Madawaska County. The first grade included the oldest settlers, with passably comfortable houses, a considerable acreage of land reclaimed from the forest, with fields showing a more or less scientific attempt at cultivation. The second grade showed a link between the modern and the settler of bygone years. There was the frame house, and near by the tottering remains of the old log cabin where the "rude forefathers of the hamlet" dwelt, now a picture of ruin and distress. For what more distressed picture is there than an old

house, which in its day merely served the purpose of shelter? The last or frontier settlement is on the verge of civilization, and we are standing before the last hut before plunging into the forest. And this hut is typical of a dozen that we have seen in the last few miles. Not a vestige of a tree or shrub around the bare and comfortless hovel; a half starved geranium in the only window that fronted the roadway; a group of shy children that refused our advances and scattered to the rear of the house on our approach; a dog that growled sullen defiance and betook himself to the door where he showed his gleaming teeth in a very unmistakable way.

It is not to be wondered at that we bade good-bye to civilization (?) on that hot July day, and betook ourselves to the grateful shade of the forest with the liveliest relief and satisfaction. A great city is not the only place where we meet with extremes of wealth and poverty, of high life and low life. As we entered the woods and saw those aristocratic elms and maples and pines, we were impressed with their magnificence, and could not help thinking that if those poor settlers, when they carved homes for themselves in the wilderness had thought that they had other wants to satisfy than mere physical wants, they would have left standing one or two lordly forest trees and reared their humble roofs under their grateful shade. It seems to me that the Giver of all blessings would look down upon such a habitation as that and pronounce it "good." How much better is man, both physically and intellectually, with trees as neighbours and companions, beneath whose cool shade he can rest himself and smoke his pipe in contentment as he surveys his growing acres, and thank God for them all.

And yet in that whole settlement there was not a shade tree worthy the name, but instead a mournful line of wretched dwellings strung along the road. The man had been swallowed up in the wood chopper and he thinks only of chopping down the native growths, clearing up the vines and trees and shrubbery and sacrificing everything to present utility. He begrudges a few inches of soil to the rightful owners, who would thankfully bless him every day of his busy life for sparing them. But instead of thinking of the tree as a friend the settler looks upon it as an enemy, one that must be rooted out and destroyed. And tree murderers are not confined to Madawaska County.

But I started out to write notes on the flora of the Restigouche. A few miles from St. Leonard's we saw a honeysuckle which proved to be the Swamp Honeysuckle (*Lonicera oblongifolia*), a plant new to our provincial flora. Through the settlement we found the same weeds disputing the possession of the soil with the farmers as we find in other places. The Ox-eye Daisy and the Cone-flower (*Rudbeckia hirta*) in the grass-fields, the Wild Mustard in the grain fields, and a profusion of Campion flowers (*Silene Cucubalus*) on the roadside. When we entered the forest our road, which had to be cut at intervals, lay along beautiful stretches of woodland chiefly rock maple and yellow and gray birch, with a beautiful under-shrubbery of *Viburnum lantanoides*. The gentle ascents were clothed with mosses, the Twin Flower (*Linnaea borealis*), scenting the woods with its fragrant odor, and the White Oxalis (*Oxalis acetosella*), in contrast with sphagnum of the hollows with dense shrubbery of viburnums and cornuses, with pyrolas in bloom, and with some fine specimens of *Habenaria orbiculata*, its loose spike of greenish-white flowers with

their long spurs reminding one strongly of tropical orchids. This water shed, dividing the St. John from the Restigouche, is a gently undulating tableland, elevated about eight hundred or a thousand feet above the sea-level and well watered. Many of the streams trickle slowly through swamps and find their way either to the tributaries of the St. John or Restigouche. It has a soil, to judge from the vegetation upon it, nowhere exceeded in richness throughout this province, except in the alluvial valleys of its chief rivers. Derived from the disintegration of the underlying Silurian slates, the soil is apparently of considerable depth, remarkably free from stones, and would form a rich agricultural district if rendered more accessible by post road and railway. A railway across the northern part of New Brunswick from the Bay of Chaleur to the valley of the St. John, would open up for settlement this rich tract of watershed and the upper Restigouche, and bring into general view some of the most rugged and picturesque scenery of Eastern Canada. But this grand primeval wilderness would be blackened and desolated by forest fires,—the sure attendant of frontier settlements. The shrill whistle of the locomotive would be daily heard in those solitudes whose silence is only occasionally broken by the gentle sounds of the canoeman's paddle, the whirl of the angler's rod, the ringing echo of the sportsman's gun, or the clear strokes of the lumberman's axe. The adventurous spirits who love these solitudes might wish that "the greatest good to the greatest number" would be indefinitely postponed, and that the difficulties in the way of railroad communication may prove an insuperable obstacle in breaking up this sportsman's paradise.

About four o'clock on the afternoon of July 25th, our ears were gladdened by the welcome sounds of rippling

waters, and in a few minutes we stood on the bank of the Restigouche, whose praises have been celebrated in poetry and prose by delighted anglers from both continents. Its clear waters now gliding swiftly over the pebbly bottom, now reposing in some quiet pool, gave the anglers an invitation to "cast" which was promptly accepted, and a few speckled beauties gave promise of sport and welcome additions to our not over-abundant camp supplies. We found the water very low — not deep enough in the shallow places to float a loaded canoe — and that meant work for the canoemen. But who would object to a little work in that clear mountain air and the prospect of a run of over a hundred miles on the Restigouche! We pitched our tent on that famous camping ground near the mouth of the Waagan, the resting place for many years of voyageurs like ourselves — a pretty bit of meadow but whose edges were blackened by the fires of too careless campers of other years. The camp of the absent warden was taken possession of by our guides, and before sundown we had everything in good shape for a comfortable night. But we had reckoned without our hosts — the flies. They came in swarms — mosquitoes, black flies, sand flies, bite-'em-no-see-'ems and others of the vile horde that are the anathema of woodsmen. We used all the resources at our command — smudges, veils, ointments and the mildest adjectives that our vocabulary would allow us to use, but they would not off. They wanted tribute and, like Macbeth, they would have blood. We paid the tribute as calmly as we could, and gained in experience what we lost in flesh. I took a bottle of villanous ointment that caused me more discomfort than the flies; a mosquito net kept out the largest and was not uncomfortable on hot days, with a breeze that would drive the air through it. A "smudge" is effective but it is as likely to drive you

out of the tent as the flies. The best plan we found was to choose a camping ground in the woods, and when we did so were nearly free from discomfort. One night, at the mouth of the Gounamitz, we slept on a sand beach. We never repeated that experiment. The recollections of the moonlight effects on the bluff that towered more than a hundred feet from the water on the opposite side of the river, and the rugged beauties that the morning sunlight flashed back to us from those pinnacles of rock and tree, were no compensation for that night of sleepless torture. Never sleep on a sand beach; choose a ground a trifle elevated and leafy; build two or three fires not far from the tent door; keep good hours and close up the tent early; then, if you haven't been dodging the fish warden through the day, and your conscience is clear in other respects, you will probably sleep soundly.

The old route between the St. John and the Restigouche was by canoe up the Grand River and into one of its small tributaries, the Waagansis; thence by a "carry" of three miles into the Waagan, an affluent of the Restigouche, and down that stream to the spot where we made our first camp. But that is now practically impossible owing to the filling up of the slow-running Waagan, and the dense growth of bushes which almost conceals it. I could scarcely believe that it had ever been passable for canoes. But we saw it at the height of an unusually dry season.

One of the last plants that we saw on the borders of the Grand River Settlement was the Campion Flower (*Silene Cucubalus*). It was the first to attract our attention on the pebbly beaches of the Restigouche. It was almost constantly in sight on the whole course of the river. And yet it is not a native plant, but introduced on to this continent from the old world where it occupies wide areas

from North Africa and India to the Arctic Ocean. It has evidently followed the footsteps of man, both as settler and explorer, for it is as abundant on the upper St. John as on the Restigouche. Its inflated grayish-green calyx is beautifully veined and surmounted by white petals. Growing in dense clumps, it is an attractive plant. In the woods near by we found our common Hop (*Humulus Lupulus*) and from its position here and at other points on the river it is without doubt indigenous to our province. I saw some fine specimens in fruit of the Wake-Robin or Nodding Trillium (*Trillium cernuum*), and several species of wild gooseberry and currants (*Ribes*).

I shall only make mention in connection with this trip of those plants that are new or rare to the province, or those that are striking by their great abundance, luxuriance of growth, or other distinguishing features. I feel sure that this, the first descriptive account of the flora of the Restigouche, will be full of interest to you, occupying as this river does, the northern limit of the province, and prior to the visit of Dr. Cox and Mr. Brittain, a few years ago, almost unknown to botanists. I wish to acknowledge at the outset my indebtedness to these gentlemen for lists of the plants they collected; to Messrs. R. Chalmers and R. W. Ells of the Geological Survey Department, whose valuable reports on the surface geology and forest growths of Northern New Brunswick I have availed myself of to a full extent; to Mr. Walter Deane, of Cambridge, for his assistance in identifying doubtful species; and chiefly to my sole companion of the voyage, Dr. W. F. Ganong, without whose knowledge of affairs and wide experience in wood craft, the trip could not have been made, and whose genial comradeship will always remain as one of the pleasantest features of the trip.

Let me attempt to give you a few general ideas of the topographical features of this northern heritage of ours. I may remind you that the chief watershed of New Brunswick extends from the extreme northwest limit of the province southeasterly to Baie Verte; that the eastern slope extending from this is drained by the Restigouche, Nipisiguit, Miramichi, and by a great number of smaller rivers. The south-western slope is drained by the St. John and its tributaries, and by smaller rivers. Next to the St. John and Miramichi the Restigouche is the largest river in New Brunswick. It is 150 miles long and drains an area within the province, of 2,200 square miles, about one-fifth of that drained by the St. John, and less than one-half the area drained by the Miramichi, although as a whole, the basin of the Restigouche is nearly as great as that of the Miramichi. Its chief tributary from the south is the Upsalquitch, and three chief branches from the north are the Katawamkedgwick, the Patapedia, and the Metapedia, one of which at least is larger than the main stream; but the main stream is considered to have the right to the name because of its generally direct course from the watershed in Northern New Brunswick to the Gulf of St. Lawrence. The Metapedia is wholly a Quebec river, the Patapedia forms the boundary between this province and Quebec in the lower half of its course, while the Katawamkedgwick, wider and of greater volume than the Restigouche, where it joins the latter, flows only for the last forty or fifty miles of its course within New Brunswick territory. The wide divergence of these four tributaries from the main stream is the origin of the Indian name Restigouche (river of the five fingers). The Restigouche takes its rise in the north-east of the County of Madawaska, near Prospect Peak, and about twenty-

five miles north-west of our camping ground at the mouth of the Waagan. Its waters are clear and cold, from the springs and lakes of the dense wilderness to the north,—and some of these sources are probably within the province of Quebec. Its flow is strong and swift, broken by rapids on an average of every one hundred yards, but nowhere impassable for a canoe. In its course of 110 miles, from the Waagan to Tide Head, above Campbellton, there is a descent of from 400 to 600 feet. The Restigouche flows through a narrow valley, growing deeper as you descend the stream, flanked by hills rising very steep from the waters' edge, but scarcely ever too steep not to admit of a luxuriant vegetation, chiefly evergreen. In the loops formed by its winding course there may be seen, at intervals, now a stretch of meadow land, now beautiful terraces from thirty to seventy feet above the river; but so suddenly does the stream change its course and rush to the opposite side again, that these meadows and terraces alternate from one side of the river to the other in quick succession. These level spots are clothed with the most luxuriant vegetation, whose vivid green contrasts with the clear, flashing waters below them and the dark evergreen of the hillsides beyond.

Can you imagine greater pleasure than this—to sit in a canoe, paddle in hand, and wind in and out at the rate of five or six miles an hour amid scenes like these? And how we wished when our journey was ended that we had gone more slowly! Yet we only ran three or four hours, on an average, each day.

I agree with the author of "Little Rivers" when he says: "A river is the most human and companionable of all inanimate things. It has a life, a character, a voice of its own, and is as full of good fellowship as a sugar maple is of sap. * * * * The life of a river, like that of

a human being, consists of the union of soul and body. They belong together. They act and react on each other. The stream moulds and makes the shore; hollowing out a bay here and building a long point there; alluring the little bushes close to its side, and bending the tall slim trees over its current, sweeping a rocky ledge clean of everything but moss, and sending a still lagoon full of white arrow-heads and rosy knot-weed far back into the meadow. The shore guides and controls the stream * * bending it into a hundred sinuous curves * * here hiding the water in a deep cleft overhung with green branches, and there spreading it out, like a mirror framed in daisies to reflect the sky and clouds, sometimes breaking it with sudden turns and unexpected falls into musical laughter, sometimes soothing it into a sleepy motion like the flow of a dream." The author might have had the Restigouche in mind, for such a description suits it exactly.

With patches of meadow and terrace, near each other, yet separated by the river, and with precipitous hills rising on all sides, the upper Restigouche can never be a country of farms. The smallness of the terraces and meadows, the precipitous hillsides and wild scenery, are better suited for those fishing lodges, simply planned, all of them after the same pattern but in harmony with their surroundings, which we find farther down the river, perched above some salmon pool, and empty, except during the fishing season each year.

About 12 o'clock on the day following our arrival at the Waagan our guides left for home and we began the descent of the river. The prospect before us of a fortnight in the wilderness, the "paddling our own canoe" through those rapids of the curving gorges ahead, our independence of guides, the anticipation of the discovery of some new plant, sent the blood dancing in our veins with ex-

hilarating flow as we seized our paddles and shoved out into mid-stream. The success of our expedition and our own safety depend on the careful handling of our canoe. Tenderly we lift it over shallows and guide it carefully and slowly through the swirling eddies as the river rushes past some precipitous bluff. Then, as we shoot out of the rapids and glide gently over some smoother current, we rest on our paddles and gaze for a moment on the wondrously beautiful scene around us. But it is only for a moment or two. The eager and impetuous stream ahead of us is chafing over pebbles and rocks, and we must choose the course that promises the greatest safety and the least labor. But it is done safely; and the caution and unerring instincts of the steersman were rewarded by not even the approach to an accident during the whole descent of the river. Here and there, as if to lighten our task, little brooks and larger streams came dashing in with their supplies, and the river grew more expansive and deeper, but more headstrong. Our course at first lay among gently elevated hills well back from the river, not more than fifty to one hundred feet in height, but the river seemed bent on diving farther and farther into the recesses of the earth. The gorge deepened as we advanced, and the hills grew into mountains until they attained in places an altitude of a thousand feet and upwards.

On our first afternoon we passed several fertile meadows where the Ostrich Fern (*Onoclea Struthiopteris*) grew in the greatest abundance, and so luxuriant that fronds six feet in height were not rare. This fern is probably the most abundant on the river, the rich alluvial soil and cool shady ravines furnishing a most congenial habitat. A shield fern (*Aspidium aculeatum* var. *Braunii*) was found growing with the Ostrich Fern in greater abundance than

we had ever seen it before. Its fronds are usually a foot or so in height but one frond measured three feet in height. The deep green color of this fern and the light brown chaffy scales of the stipe and rachis make it one of the most beautiful and desirable of our ferns. The most common *Ranunculus* along the Restigouche was *Ranunculus septentrionalis*, especially on its upper waters, but *R. flammula* var. *reptans* was met with commonly on sandy shores, and *R. tricophyllus* in the shallow water of the ponds or bogans, where it is found with the Arrow-head (*Sagittaria variabilis*) and its many varieties, their white flowers covering the waters in greatest profusion. Hunter's Brook, about five miles below the Waagan, invited an exploration. It flows into the Restigouche from the south through a rocky gorge whose shelving and precipitous sides of calcareous slates were clothed with mosses and ferns of the most luxuriant growth. The common Rock Fern (*Polypodium vulgare*) which has been considered rare in northern countries is very abundant here. One frond measured eighteen to twenty inches in height. The green Spleenwort (*Asplenium viride*), the Bladder ferns (*Cystopteris bulbifera* and *C. fragilis*) and the Spleenwort (*Asplenium thelypteroides*) were growing here in unwonted size and variety.

The trees along the Restigouche are largely evergreen which would give a sombre character to the deep valley, but for the sparkling waters and the numerous windings which bring other characteristics rapidly into view. Of evergreens the White Spruce (*Picea alba*) is the most abundant. The Black Spruce (*Picea nigra*) is much rarer, while very few pines, and these only of one species, the White Pine (*Pinus Strobus*), are to be seen along the river. The Cedar (*Thuja occidentalis*), is quite common, so also is the Balsam Fir (*Abies balsamea*), whose long, slender

trunks often rising to the height of seventy or eighty feet and clothed with Old Man's Beard (*Usnea barbata*), are a conspicuous object along the banks. No tamaracks were seen on the banks of the Upper Restigouche and but few farther down. Of deciduous trees, the balsam poplar (*Populus balsamifera*) is the most abundant on the low grounds, and is found everywhere along the river. Elms, black, white and yellow birches, the white and black ash, maple, especially the red maple (*Acer rubrum*), with alders. Willows and sumachs are quite common.

The second day's run brought us to the mouth of the Gounamitz (Little Forks) about fifteen miles below the mouth of the Waagan. This is the first large tributary of the Restigouche and flows in from the north. The scenery about the mouth is very wild and picturesque, the cliffs rising from the river to the height of over one hundred feet. At the base of these cliffs we found growing that delicate and beautiful fern the Cliff Brake (*Pellaea gracilis*), and the *Asplenium viride*, lichens and mosses in the greatest variety and abundance, giving promise of rare and perhaps new species had we taken the opportunity, to collect them. Patches of dandelion and ox-eye daisy and the song of a robin remind us we are not beyond the pale of civilization. Here we find a violet (*Viola primulaefolia*), rare in this province. A mile below the forks of the Gounamitz is Boston Brook, evidently a favored camping ground. Here we found growing in considerable abundance a vetch with yellow flowers (*Lathyrus pratensis*), the only place on the river where we noticed it. Below Boston Brook the country changes to a marked extent from a hilly to a level country, but only for a mile or two,—a good site for a frontier settlement. A short distance further down, just below

Jardine's Brook, the Silurian ledges cropping out remind us of the Upper St. John and its flora. Here we find the first wild rose met with on the trip (*Rosa Carolina*), two anemones (*Anemone Pennsylvanica*) and *A. cylindrica*, the Painted Cup (*Castilleja pallida* var *septentrionalis*), *Hedysarum boreale*, the Poison Ivy, (*Rhus toxicodendron*), the Bilberry (*Amelanchier Canadensis*), *Lobelia Kalmii* and others—all Upper St. John plants.

Our fourth camping ground was near the mouth of the Kedgewick which here comes in from the north and is the largest affluent of the Restigouche. There is a fine stretch of meadow land here and a good farm, the first met with on the river, owned by Mr. Mowatt. We went about half a mile up the Kedgewick, found several rare carices, and an evening primrose (*Oenothera Oakesiana*). A little below the mouth of the Kedgewick on the right bank of the river is the fishing lodge of Col. Rogers, of New York, who owns the famous fishing pool known as "Jimmy's Hole" where the water is from thirty to forty feet deep, a steep wall of white rock rising from the eastern side; and next is Soldier's Gulch, the best salmon pool on the river. A little below on a picturesque little nook at a bend of the river we come upon the summer camp of Mr. Ayer, of Bangor, and two miles farther we reach Down's Gulch, a fine camping ground. Here we found the Grass of Parnassus (*Parnassia Caroliniana*), *Tofieldia glutinosa*, *Hedysarum boreale*, *Astragalus alpinus*, very abundant along the lower river, the purple fringed Orchis (*Habenaria psycodes*), the Rock Strawberry (*Fragaria vesca*), *Anemone cylindrica*, several rare carices and several species of juncus. For the next ten miles we pass through some of the most striking and picturesque scenery on the Restigouche. The river makes sudden turns, and leaps tumultuously from rapid to rapid, vainly strikes against the base of a

rocky eminence and recoils, seething and foaming, to take a great sweep to the right, and seek a sullen repose in the great black pool beyond. There seems scarcely room enough for the river in the narrow gorge through which it rushes, careering to almost every quarter of the compass. Salmon pools are frequent and very deep. The hills rise to the height of six hundred to eight hundred feet, and the presence of more deciduous trees, such as maples and birches renders the foliage less sombre than farther up the river. Opposite the frequent bends in the river are numerous terraces from thirty to fifty feet high, some of them, especially those at Red Bank and the mouth of the Patapedia, being of considerable extent and all in the most picturesque and beautiful situations imaginable, sloping down to the edge of deep pools and giving the opportunity to view from their vantage ground scenery that cannot be equalled in these provinces. Nearly all these terraces have fishing lodges built upon them owned by the Restigouche Salmon Club.

The Devil's Half-Acre, as might be supposed, is one of the wildest and most rugged spots, and is a precipitous bluff, whose rocky base is surmounted by calcareous slates, rising from the river to a height of some three hundred feet. His satanic majesty's preserve, however, was a very good botanical ground. The Buffalo-berry (*Shepherdia Canadensis*), *Polypodium vulgare*, *Woodsia Ilvensis*, *Solidago squarrosa*, *Potentilla arguta*, roses and pyrolas occurred, and several heath plants were seen here, although this family is somewhat rare on the Restigouche. Nearly opposite the mouth of the Patapedia (Pata-pee-jaw, with a strong emphasis on the last syllable, is the local name) is a large farm owned by Mr. Wyer, and there is considerable interval land in the vicinity. Although the salmon season was about over there was one angler who

was paying his second visit to the famous pool at the mouth of the Patapedia — the Rev. Dr. Rainsford of New York, and the next morning we enjoyed salmon fishing — by proxy.

Cross Point is a romantic spot on this most picturesque part of the river. Climbing to the top of the rocky and dizzy height which is surmounted by a rough wooden cross, we overlook a magnificent stretch of endless hills and gorges. Three hundred feet below us the river flows in a northeast direction and curving round, forming an oval peninsula, takes a directly opposite course. So closely does the river double on itself that one can sit on the narrow mountain ledge, about the width of a saddle, with a foot dangling over each stream. It is not a spot that would insure peaceful dreams for the following night if one remained very long upon it.

From the mouth of the Patapedia down we have Quebec Province on our left and New Brunswick on our right, for from the mouth of this river to the Bay of Chaleur the Restigouche forms the boundary line between the two provinces.

Our camping ground on the night of 31st July was Tom's Island, which we reached just at dark; a clear, cold night with frost or a very near approach to it — and no flies! This island, situated at the mouth of Tom Ferguson's Brook, proved so interesting in its variety of plants that we spent the greater part of the next day in investigating them. The island — or rather peninsula at low water — forms the apex of a bend in the river. The isthmus connecting it with the right hand bank of the river is of Upper Silurian limestone, highly tilted, and no doubt underlies the island. The central portion of the island is about one hundred yards long and twenty wide in the broadest part, covered with alluvial soil, and

bearing a dense vegetation, with a margin extending up river about four hundred yards of more stony material bearing shrubs and low herbs. It can readily be seen that an island in this position at a point where the river almost doubles on itself, and with a stream flowing into it from a direction opposite to that of the river would be in a good position to receive plant seed and should have a varied plant growth, and so it proved. In this limited area and on the adjoining isthmus we found over one hundred different species of flowering plants. The examination of the island proved so interesting that I must make it the subject of a separate article. I observed here the Huronian Tansy (*Tanacetum Huronense*), its first station on the river, and further east, I believe, than it has ever been noted on the continent.

We camped over Sunday on a terrace overlooking the chain of rocks, having passed safely through Hero's Rapids, the most dangerous on the river. Here we found Butterwort (*Pinguicula vulgaris*), the Shrubby Cinque-foil (*Potentilla fruticosa*), the Cleft-leaved Anemone (*Anemone multifida*), the Ground-nut or Wild Bean (*Apios tuberosa*), the Wild Onion (*Allium Schænoprasum*), the Marsh Marigold (*Caltha palustris*), the Primrose or Cowslip (*Primula Mistassinica*), *Pellaea gracilis*, *Desmodium Canadense*, the Milk-vetch (*Astragalus oroboides*), the Beach Plum (*Prunus pumila*), *Oxytropus campestris* var. *caerulea*, the Bearberry (*Arctostaphylos Uva-ursi*), the Milkweed (*Asclepias Cornuti*), the Rattlesnake-root (*Nabalus racemosus*), the Pale Touch-me-not (*Impatiens pallida*), and other interesting forms.

Pinguicula vulgaris, which was discovered by Dr. Cox and Mr. Brittain on their trip down the Restigouche a few years ago, is a most interesting addition to our New Brunswick flora. It is probably in this province confined

to the Restigouche, and, so far as determined, occupies a narrow strip extending about twenty miles, from the Chain of Rocks to half a mile below Morissey's Rock. It belongs to the insectivorous plants, and one might wish that it was found in much greater abundance through the whole length of the Restigouche. Its area of distribution is wide, extending over the Arctic and subarctic regions of North America, Europe and Asia. On the Restigouche it is found with the primrose, mosses, and other plants loving like situations, on wet rocks over which flow waters from cold springs. It has two-lipped flowers of a violet blue color borne singly on the top of slender scapes, about six inches high, which spring from the centre of a rosette of leaves of a yellowish-green color, which rest on the rock or ground. The margin of each leaf is turned upward forming a kind of trough, and the whole upper surface of the leaves is covered with minute glands, which secrete a kind of mucilage, entrapping midges and other small insects. Like our Sundew (*Drosera rotundifolia*), these glands are not stimulated to action by drops of rain or the pressure upon them of minute grains of mineral substance, but when an organic body, such as an insect, is brought in contact with them they are stimulated and pour forth, in addition to the mucilage, an acid secretion which has the power to dissolve animal substances, behaving exactly as does the gastric juice in the animal stomach, digesting the unfortunate insect that alights upon the leaves. In the *Drosera* the tentacles which are found upon the upper surface of the leaves in such abundance aid in capturing the insects. In *Pinguicula* the upturned edge of the leaf performs that office. If the insect attempts to crawl over this margin the edge curves over still further imprisoning the insect and pushing it toward the middle to bring it in contact with as many glands as possible. After absorption

is accomplished, which usually occupies from twenty to thirty hours, the leaf expands again exposing the bleached remains of the insect, and setting a fresh trap for others. The leaves of *Pinguicula* are greasy to the touch hence its name from *pinguis*, fat. Its common name, Butterwort, is for the same reason.

A short distance below the Chain of Rocks we heard the sharp click of a mowing machine, a sign that we were approaching the outer world again and beyond was a small settlement (Mann Settlement) with further incontestable evidence of civilization—a school house. A short distance below was Deeside, a settlement which contains a church. On Green Island, near Deeside, we found growing in great abundance the Blood-root (*Sanguinaria Canadensis*) and the Pappoose-root (*Caulophyllum thalictroides*) another St. John River plant. Here too we found the Black Cherry (*Prunus serotina*). Soon we came to the mouth of the Upsalquitch with a fine club house, belonging to the Upsalquitch Salmon Club, fronting on the main river, and a little farther down a few yards below the mouth of the Upsalquitch is the fishing lodge of Dean Sage of Albany, the author of a finely illustrated book on the Restigouche.

Opposite the mouth of the Upsalquitch is the settlement of Runnymede, on a rich alluvial meadow, the joint tribute of the Upsalquitch and Restigouche.

But the last bend in the river brought into view a more imposing sight—the Squaw Cap Mountain and about two miles north of it and a little on our left, Slate Mountain. These twin peaks, the highest land along the Restigouche, rise to the height each of two thousand feet, or fully one thousand feet higher than the Sugar Loaf at Campbellton. It was half past two o'clock that day when we began the ascent of the Squaw Cap, and we were

back again at half past seven — total distance ten miles, and some of that was hard climbing, but it was worth it. For three miles our course lay along Squaw Cap Brook, a clear stream whose ice cold waters were very grateful. Mr. Jas. Harris, whose farm is about a mile in from the Upsalquitch, was our guide. He showed us a part of his farm where the grass fields were completely covered by a weed whose presence has not been before noted in this province, a Hawkweed (*Hieracium præaltum*). It is an ill favored plant about a foot high, hairy with yellow flowers in an open cyme, and a rosette of leaves which rest on the ground. So completely had these rosettes of leaves taken possession of the ground that every other form of vegetation was killed — even the grass. We had never seen a weed so completely master of the situation, and that is saying a great deal. Mr. Harris is almost in despair at the advances of this pest which threatens to cover his entire farm.

There was a wonderfully luxuriant flora along that wood road which led to the base of the Squaw Cap. The tall Joe Pye weed with its broad heads of ragged purple flowers towered above us fully eight to ten feet high; the Meadow-rue (*Thalictrum polygamum*) with its rich white and green flowers looked more delicately beautiful in this dense vegetation than ever before. Pyrolas covered the ground everywhere in those mossy woods with their racemes of nodding white or rose colored flowers. Orchids of brilliant hues grew so luxuriantly in those woods that we could imagine ourselves in tropical forests. But what is that orchid with the deep green leaves reticulated with white, and bearing a raceme of delicate brownish flowers? It was quickly gathered and consigned to the tin box, and proves to be an orchid new to the Province — *Goodyera Mensiezii*, making three of this beautiful genus found in

New Brunswick. We also found here *Goodyera pubescens* its second station in the Province. Our last half mile up the Squaw Cap was a most toilsome one, but our spirits were gladdened and refreshed by the clusters of rare ferns that grew in ringlets round this Cap—*Aspidium fragrans*, *Phegopteris calcarea*, *Woodsia glabella*, *Woodsia hyperborea*, all rare in this province and known only at one or two stations. These with other rare plants met with on the Restigouche I brought home and planted, and hope that next season I may have something better than these dried specimens to show you.

On the southern side of Squaw Cap Mountain we obtained a fine view of that great central watershed of the Province from which some single peaks rise, two thousand to two thousand five hundred feet above the level of the sea. There is easily picked out an old friend of former years—Bald Mountain on the Tobique, a trifle higher than the elevation on which we are now perched, tired and panting, but delighted. Away off to the southwest is the monarch of them all—Katahdin, in Maine, over five thousand feet high. From the north side the view is scarcely less imposing—the ranges and peaks of Quebec with the valley of the St. Lawrence beyond them. Just opposite to us, Slate Mountain, only three miles away, was wreathed in smiles of a rapidly descending sun, and beckoned us invitingly, but we turned regretfully away with many promises of a return which I hope will not lack fulfilment.

What a tramp that was! How tired we were! but when we looked over the treasures in the tin box, there was no weariness. We were delighted to see even a warden, and he looked curiously at our driers and press and the plants stowed away in them.

The river from the mouth of the Upsalquitch down is settled, and we soon come to the estuary, studded with islands, their alluvial soil rank with vegetation. On one of these islands—at the mouth of the Metapedia, we find the Maidenhair fern (*Adiantum pedatum*) and the Wild Ginger-root (*Asarum Canadense*). From Morissey's Rock we took a parting view of the Upper Restigouche, and a grand view it was. Here we found *Aspidium fragrans* again, *Woodsia hyperborea*, *Woodsia glabella* and near by *Pellaea gracilis* and the Small-flowered Anemone (*Anemone parviflora*).

SUMMARY.

We found eleven plants new to the province which are given in an appended list, with others rare or little known before. Of all our native orders the ferns seem to be of greater variety on the Restigouche than elsewhere in the province. The Leguminosæ family come next in abundance, then the Conifers the Rose family and the Compositæ. The Heath family is rarer in species here than anywhere else in the province. The presence of many alpine plants, especially near the mouths of rivers flowing in from the mountainous parts of south-eastern Quebec, is of interest.

LIST OF PLANTS NEW AND RARE.

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|---|---------------------------------------|
| Anemone parviflora, Mich. | Gilia (Collomia) linearis, Nutt. |
| A. multifida, DC. | Cynoglossum Virginicum, L. |
| A. cylindrica, Gray. | Pinguicula vulgaris, L. |
| Viola primulæfolia, L. | Asarum Canadense, L. |
| Astragalus oroboides. | Salix longifolia, Muhl. |
| Oxytropis campestris, DC., | Populus balsamifera, L., var. |
| var cærulea, Koch. | Candicans (?) Gray. |
| Lathyrus pratensis, L. | *Goodyera Menziesii, Lindl. |
| * <i>Oenothera Oakesiana</i> , Robbins. | G. pubescens, R. Br. |
| * <i>Lonicera oblongifolia</i> , Muhl | * <i>Sagittaria arifolia</i> . |
| * <i>Solidago Virgaurea</i> L., var | Carex atrata, L. var ovata, Boott. |
| alpina, Bigel. | *C. flava, L., var. graminis, Bailey. |

* Those marked * are new.

LIST OF PLANTS NEW AND RARE—(*Continued.*)

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| * <i>Aster longifolius</i> , Lam., var <i>villicaulis</i> , Gray. | * <i>C. flava</i> , L., var <i>viridula</i> , Bailey. |
| * <i>Hieracium præaltum</i> , Vill. | * <i>Phleum alpinum</i> , L. |
| <i>Arctostaphylos Uva-ursi</i> , Spreng. | * <i>Equisetum littorale</i> , Kuhlewein. |
| <i>Pyrola minor</i> , L. | <i>Pellæa gracilis</i> , Hook. |
| <i>P. rotundifolia</i> , L., var | <i>Asplenium viride</i> , Hudson. |
| <i>asarifolia</i> . | <i>Phegopteris calcarea</i> , Fee. |
| | <i>Woodsia hyperborea</i> , R. Br. |
| | <i>W. glabella</i> , R. Br. |

* Those marked * are new.

Dr. Matthew said that Mr. Hay's paper was the most important contribution to the botany of the province since Dr. Bailey's paper, descriptive of his trip up the Tobique and down the Nepisiguit in 1867. The area of country extending from the St. John River to the Restigouche and down the valley of that river, is a plateau country underlain by Silurian slates, and through this the valley of the Restigouche has been cut. Owing to the considerable amount of lime in those slates they produce a fertile soil, for having been formed under the sea, they are rich in animal remains. The fact that they are thus calcareous, and that they are full of cleavage planes and cracks, highly inclined, helps to give them a natural drainage, and thus improve the capabilities of the country for farming purposes. The remnant of this plateau cut and carved by the Restigouche in past ages, now stands out along its lower courses as slate hills and ridges; but towards its mouth outbursts of igneous rock have further broken up the plateau and produced hills and ridges which are represented on the map of the Dominion Geological Survey by a bright red color. The absence of Heath plants, to which the writer of the above essay refers, is a good feature in the flora, as it indicates the absence of a barren, rocky and water-soaked country, such as these plants delight in. And notwithstanding the shortness of the season and the proximity of this plateau to a hill country on each side, it should contain considerable areas of good farming land, available for settlement.

Mr. S. W. Kain said that a number of the plants referred to in the paper were of a subarctic type—*Aspidium fragrans* especially. This taken in connection with the fact that the estuary of the Restigouche, and Bay Chaleur were frozen over early in the fall and only opened in May, would seem to show that further botanical exploration in this part of the province might result in the discovery of more plants of a northern character than are now recorded.

